

## (b) Some application cases

(1) Rate laws (no input data)

**Only model and prior**

Model stoichiometry, prior distributions, lower/upper bounds, Parameter dependencies



Parameter  
Balancing



Balanced model parameters

(2) Rate laws (kinetic constants)

**Measured kinetic constants**

Catalytic constants, Michaelis constants, equilibrium constants



Parameter  
Balancing



Balanced model parameters  
Catalytic constants, Michaelis constants, equilibrium constants

(3) Metabolic state  
(concentrations and driving forces)

**Measured state variables**

Metabolite levels, equilibrium constants



Parameter  
Balancing



Balanced state variables  
Metabolite levels, equilibrium constants, chemical potentials, driving forces

(4) Rate laws and metabolic state

**Measured kinetic constants  
and measured state variables**



Parameter  
Balancing



Balanced model parameters  
and state variables (as in 1 and 2)

(5) Separate balancing of reactions

**Equilibrium constants**

(and possibly metabolite levels)  
as precise values, to be kept fixed



Parameter  
Balancing



Balanced model parameters  
(and possibly state variables)

(6) Making use of flux data

**Measured state variables  
and flux directions**

defining signs of driving forces,  
as constraints for metabolic state



Parameter  
Balancing



Balanced states variables,  
in agreement with flux directions  
Later step: adjust enzyme levels  
to match the predefined fluxes